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FEDERAL - STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

Platte and Arkansas Drainage Basins

By

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

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As of

MAY 1, 1951

FEDERAL-STATE COOPERATIVE SNOW SURVEY AND IRRIGATION WATER SUPPLY FORECASTS FOR PLATTE-ARKANSAS RIVER BASINS

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WATER SUPPLY OUTLOOK
PLATTE-ARKANSAS DRAINAGE BASIN

May 1, 1951

Snow accumulation to April 1 was above normal on these watersheds except for the Southern tributaries of the Arkansas. During March the increase in snow water content was about average. On the South Platte and its tributaries, snow cover is well above normal for this date. On many courses the snow water content is a maximum of record since snow surveys were started in 1936. On the headwaters of the North Platte in Colorado and Wyoming snow cover is slightly above normal. Precipitation at valley elevations has been deficient for several months and soil moisture conditions are fair to poor in most districts. Except for the large reservoirs on the North Platte, the storage in most irrigation reservoirs is below last year and the past ten-year average

CHEYENNE RIVER

The water supply outlook for the irrigated areas near the Black Hills in South Dakota is not favorable at the end of the season. Snow cover in mountain areas has been much below normal throughout the winter months. Snow in mountain areas has melted at this time and stream flow has been above average during the past 10 days. Runoff as the result of snow melt is practically complete for this season. Soil moisture conditions are reported as fair to good as of this time. Storage in Belle Fourche reservoir is now 103,000 acre-feet as compared to 141,000 acre-feet a year ago. In the Angostura reservoir there is now 34,000 acre-feet in storage.

NORTH PLATTE RIVER

On the Sweetwater River in western Wyoming the snow accumulation to date is about 110 percent of normal. Similar conditions also exist on the North Platte in Wyoming and around North Park in Colorado. On Snowy Range and Rabbit Ears Pass the snow cover is well above normal. Elsewhere on the Upper North Platte watershed the snow cover is normal or slightly above normal. In the valley areas of eastern Wyoming and western Nebraska soil moisture conditions are reported as fair. Valley precipitation has been deficient. Stream flow is reported as about normal. Irrigation water supplies are assured below the major reservoirs in Wyoming. Total storage in these four reservoirs is now 1,735,000 acre-feet as compared to 1,790,000 acre-feet a year ago. This is a near record and is near three times the past ten year average. Storage in Kingsley and Sutherland reservoirs in Nebraska now totals 1,800,000 acre-feet which is slightly less than a year ago.

On the Laramie River the snow cover is well above that on the North Platte because of heavy snow cover on the Snowy Range. Soil moisture conditions in the Laramie and Wheatland areas are reported as fair to good as a result of recent precipitation. Storage in Wheatland Reservoir is now 52,000 acre-feet as compared to 55,000 acre-feet a year ago.

SOUTH PLATTE RIVER

The irrigation water supply outlook for the South Platte and its tributaries is very favorable as of this date. Snow cover in mountain areas has been well above normal throughout the winter season. Cool temperature during April has retarded snow melt and stream flow is below normal. Except for the Cache la Poudre record or near record snow water content was measured on nearly all of the snow courses on May 1, 1951. If the temperature remains cool and precipitation is normal for the first two weeks of May the peak flow of the South Platte tributaries will be relatively high. Total flow is expected to be much above last year and may possibly exceed the flow during the snow melt season in 1949. In respect to normal the snow cover on South Platte tributaries is as follows: Poudre 140 percent; Big Thompson 145 percent; Saint Vrain 165 percent; Boulder 175 percent; Clear Creek 160 percent; and South Platte above Denver 140 percent. The snow cover at medium elevations is near twice normal. This should provide above normal runoff during May. Storage in irrigation reservoirs is still much less than last year and slightly less than the past ten-year average. Soil moisture conditions throughout the valley are reported as only fair.

Water tables in the South Platte are lower than at this time a year ago in most places. The average lowering is between one and two feet but in a number of places it reached as much as 6 feet. The places registering the maximum lowering were those where pumping was greatest and where surface irrigation supplies were less than normal. Maximum declines took place along the South Platte near Henderson and Gilcrest which are between Denver and Greeley. There were similar declines near Wellington in the Cache la Poudre drainage, south of Wiggins on the Bijou and lower Kiowa and on the Beaver near Gary, about twelve miles south of Brush.

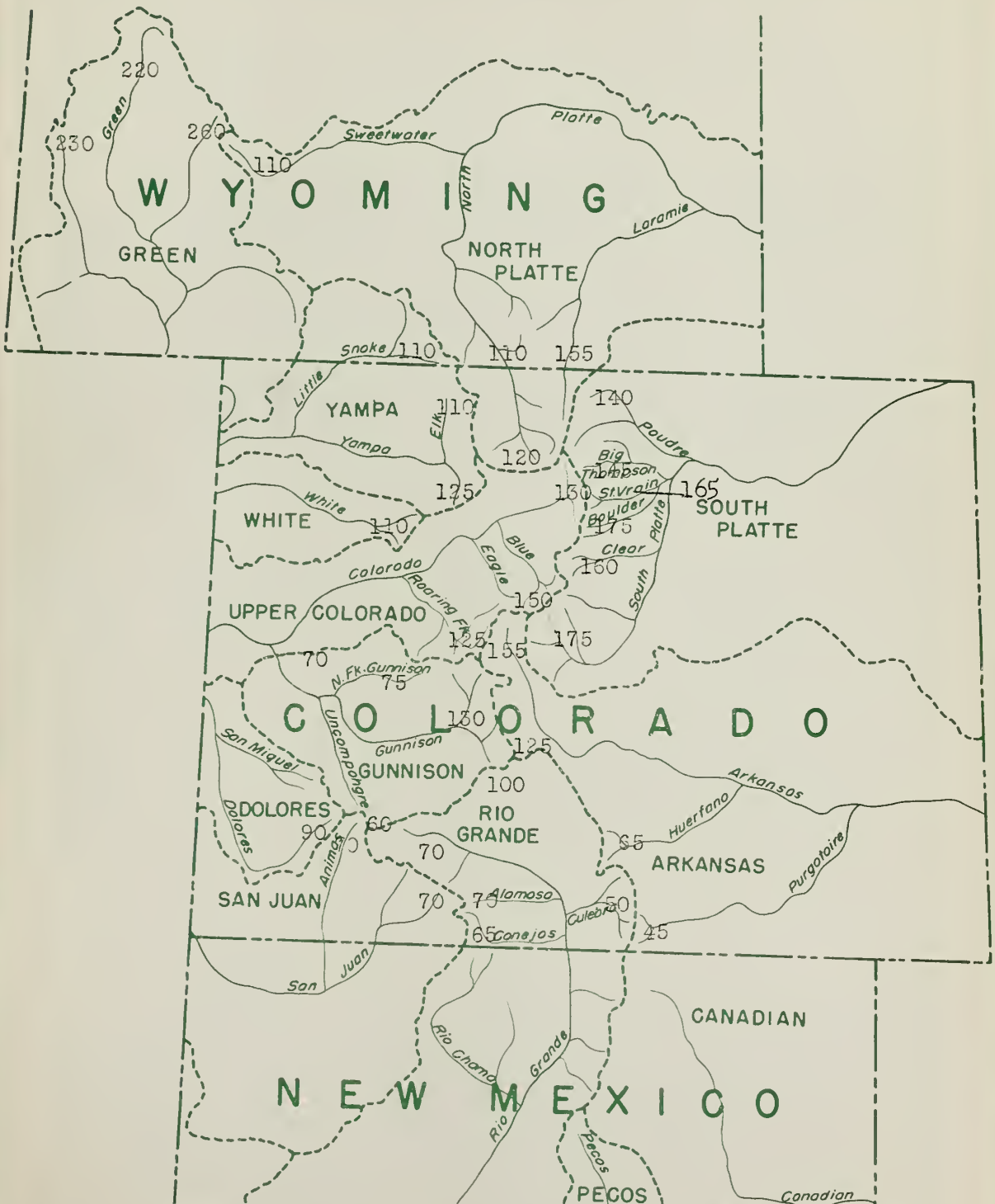
ARKANSAS RIVER

Snow cover on the Arkansas watershed is well above normal from Monarch Pass to Fremont Pass as of May 1. The extreme deficiency in snow cover still remains on the headwaters of the southern tributaries, the Huerfano, Cucharas and Purgatoire Rivers. The summer flow of these streams will probably be less than last year and near a minimum of record. The summer flow of the Arkansas at Salida and Pueblo should be well above last year and the past ten year average. Stream flow is reported as below average. Soil moisture conditions are described as poor throughout the valley. Precipitation has been deficient for several months. Except for the Twin Buttes Reservoir in southeastern Colorado carryover storage of irrigation water is very low.

Water tables along the Arkansas River between Fowler and Rocky Ford are 1 to 2 feet lower than a year ago. Little change occurred between Pueblo and Fowler. A lowering of from 1 to 2 feet occurred on the Fountain near Fountain.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal
May 1, 1951



Note: The above figures represent actual snow cover on the snow courses on the watershed in percent of normal May 1, 1951. These do not necessarily coincide with expected summer runoff in percent of normal.

PLATTE-ARKANSAS DRAINAGE BASINS
STREAM FLOW FORECASTS, May 1, 1951

Basin and Stream	April-Sept., Incl., Streamflow, Acre Feet				
	Forecast 1951	Measured Runoff 1950	1949	1948	10-year Avg. 1940-1949
NORTH PLATTE					
Sweetwater at Alcova	60,000	162,000	87,000	40,000	66,000
North Platte at Saratoga	750,000	678,000	990,000	421,000	601,000
Medicine Bow near Hanna	135,000	94,000	161,000	91,000	111,000
Laramie at Jelm	120,000	76,000	113,000	83,000	93,000
Laramie at Lookout	135,000	67,000	124,000	61,000	80,000
SOUTH PLATTE					
Poudre at Canon	300,000	186,000	323,000	201,000	245,000
Big Thompson at Drake	145,000*	104,000	172,000	95,000	113,000
Saint Vrain at Lyons	130,000	59,000	119,000	64,000	87,000
Boulder at Orodell	85,000	39,000	61,000	45,000	54,000
Clear Creek at Golden	200,000		185,000	136,000	145,000
ARKANSAS					
Arkansas at Salida	450,000	305,000	460,000	422,000	359,000
Arkansas at Pueblo	425,000	249,000	512,000	493,000	431,000
Cucharas at La Veta	10,000		16,000	17,000	19,000
Purgatoire at Trinidad	20,000		63,000	68,000	70,000

*Excluding Diversions

STATUS OF RESERVOIR STORAGE, PLATTE-ARKANSAS BASIN, May 1, 1951

BASIN AND STREAM	RESERVOIR	USABLE CAPACITY (Thous. A.F.)	THOUSANDS ACRE FEET IN STORAGE About May 1, 1951				
			1951	1950	1949	1948	10-year Avg. 1940-1949
MISSOURI RIVER							
Poudre River	Windsor	18.6	11.7	11.8	11.7	14.7	12.7
" "	Cache la Poudre	9.5	6.2	8.1	4.6	9.5	7.9
" "	Fossil Creek	11.6	7.1	9.6	6.2	10.8	8.4
" "	Terry Lake	8.2	4.2	4.5	4.6	6.1	5.2
" "	Halligan	6.4	0.0	0.0	0.0	2.5	2.1
" "	Chamber's Lake	8.8	1.9	2.8	2.3	2.7	2.8
" "	Cobb Lake	34.3	4.9	11.3	3.8	5.0	4.5
" "	Black Hollow	8.0	0.7	4.8	2.3	4.2	3.4
Big Thompson River	Lake Loveland	14.3	2.7	5.5	2.4	10.3	5.8
" " "	Boyd Lake	44.0	7.9	26.1	21.9	30.1	17.4
" " "	Lone Tree	9.2	8.7	8.2	8.0	9.3	8.0
" " "	Mariano	5.4	0.4	1.7	0.7	4.6	3.3
St. Vrain River	Union	12.7	3.4	9.1	6.1	12.7	7.1
South Platte River	Eleven Mile	81.9	71.9	81.9	81.9	81.9	80.8
" " "	Cheeseman	79.0	26.1	56.4	56.8	79.0	66.8
" " "	Marston	18.9	17.1	15.4	14.4	15.5	15.7
" " "	Barr Lake	32.2	25.0	25.3	26.9	28.5	24.1
" " "	Milton	24.4	10.2	17.6	15.0	20.8	14.9
" " "	Standley	18.5	9.6	11.0	12.5	17.8	14.2
" " "	Marshall	10.3	3.7	2.1	2.0	5.4	4.6
" " "	Antero	33.0	20.3	21.0	20.3	21.0	16.7
" " "	Horse Creek	20.6	10.9	15.2	12.2	12.5	9.9
" " "	Riverside	57.5	46.7	56.8	55.4	59.4	50.3
" " "	Empire	37.7	25.4	33.3	33.3	34.5	31.7
" " "	Jackson Lake	35.4	34.7	34.4	33.4	35.4	34.5
" " "	Prewitt	32.8	21.2	28.4	27.4	31.2	24.3
" " "	Point of Rocks	70.0	60.9	68.9	51.6	67.3	61.4
" " "	Julesburg	28.2	22.2	21.7	22.7	21.7	22.5

RESERVOIR STORAGE, Cont.

BASIN AND STREAM	RESERVOIR	USABLE CAPACITY (THOUS. A.F.)	THOUSANDS ACRE FEET IN STORAGE ABOUT MAY 1				
			1951	1950	1949	1948	10-year Avg.* 1940-1949
North Platte River	Sutherland	185.00	71.8	10.4	47.8	39.9	46.6
" " "	Kingsley	1996.0	1729.5	1838.5	1732.0	1711.0	1103.4
" " "	Minatare	60.8	47.6	53.0	36.6	48.0	39.9
" " "	Alcova	190.0	163.0	179.2	130.2	166.5	124.1
" " "	Seminoe	1025.0	546.9	601.8	549.5	646.5	319.6
" " "	Guernsey	49.2	9.4	18.9	34.1	22.5	37.0
" " "	Pathfinder	1045.5	1017.2	988.4	636.6	700.6	360.9
Laramie River	Wheatland	70.4	52.0	54.9	51.0	90.7	90.4
ARKANSAS RIVER							
Arkansas River	Twin Lakes	57.9	11.3	23.7	15.4	38.8	23.4
" "	Sugar Loaf	17.4	5.3	6.5	7.1	11.1	8.2
" "	Clear Creek	11.4	0.5	5.8	5.2	8.0	5.3
" "	Meredith	41.9	0.0	0.0	19.5	31.6	23.3
" "	Horse Creek	26.9	0.0	5.2	11.8	17.2	11.7
" "	Adobe Creek	61.6	0.0	22.0	22.5	56.8	34.5
" "	Cucharas	40.0	0.7	2.2	8.0	20.0	7.9
" "	Two Buttes	40.9	28.8	14.0	9.2	4.0	6.4
" "	John Martin	655.0	57.8	100.9	124.2	95.8	69.0*
" "	Great Plains	150.0	25.5	63.6	84.1	132.1	71.1
Purgatoire River	Model	15.0	0.0	0.2	1.2	4.3	5.2
CHEYENNE RIVER							
Cheyenne River	Belle Fourche	198.1	103.9	141.2	145.5	162.6	133.3
	Angosture	160.0	34.0	17.0	—	—	

*Some for shorter periods

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SUMMARY OF MAY 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

PLATTE-ARKANSAS DRAINAGE BASINS

WATERSHEDS	Snow Depth			Water Content			Number Courses in Average	Snow Density			1951 Water Content in percent of	
	Fourteen year Avg.*	1950	1951	Fourteen year Avg.*	1950	1951		Fourteen year Avg.*	1950	1951	Fourteen year Avg.*	1950
		In.	In.	In.	In.	In.		Percent	Percent	Percent		
PLATTE RIVER												
Sweetwater	38.0	57.0	42.8	14.0	23.6	13.7	2	37	41	32	97	58
North Platte River	47.9	53.4	55.2	18.7	20.8	20.9	10	39	39	38	112	101
Laramie River	31.7	38.6	50.2	11.1	12.8	17.4	8	35	34	35	157	136
South Platte River**	18.7	17.2	30.5	5.4	5.5	9.5	3	29	32	31	176	173
Crow Creek	7.9	5.0	7.5	2.4	1.1	1.1	1	30	22	15	46	100
Poudre River	35.1	37.0	49.2	12.6	12.4	17.8	6	36	34	36	141	143
Big Thompson River*	53.8	55.8	70.0	18.2	16.8	26.4	2	34	30	38	145	157
St. Vrain River	37.7	39.0	59.3	13.5	14.5	22.4	1	36	37	38	166	155
Boulder Creek	31.0	29.3	50.2	11.6	10.9	20.2	2	37	37	40	174	185
Clear Creek	46.4	51.3	71.5	15.9	19.3	25.1	2	34	38	35	158	130
ARKANSAS RIVER	25.0	15.3	32.3	8.3	5.4	10.9	10	33	35	34	131	202

*Some for shorter periods. **Above Denver.

PRECIPITATION DATA*

May 1, 1951

WATERSHED	STATE	Precipitation October 1 to April 30	Departure from Normal	Precipitation April	Departure from Normal
		Inches	Inches	Inches	Inches
North Platte	Wyoming	6.55	-0.96	1.67	+0.03
South Platte	Colorado	5.75	-1.34	1.43	-0.66
Arkansas	Colorado	7.09	-1.82	2.32	+0.21

*Average selected high elevation stations

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PLATTE-ARKANSAS RIVERS SNOW SURVEYS
May 1, 1951

Drainage Basin and Snow Course	Location: No. and State	Sec.	Twp.	Range	Elev.	Snow Cover Measurements: Date of Survey	Snow Depth (Inches)	Water Content (Inches): 1951	1950	1949	Past Record: Yrs. of Rec.	Av. Water Content (Inches)
					PLATTE RIVER							
SWEETWATER RIVER												
Grannier Meadows	29 Wyo.	19	30N	100W	9000	4/26	40.5	12.5	23.3	13.0	14	14.5
South Pass*	47 "	13	30N	101W	9000	4/26	45.0	14.9	23.8	13.0	11	13.4
Larsen Creek	57 "	12	30N	103W	9000		--	--	22.6	8.0	2	--
			Average for drainage				42.8	13.7	23.6	13.0		14.0
NO. PLATTE RIVER												
Cameron Pass	1 Colo.	2	6N	76W	10300	4/30	68.8	23.5	24.2	24.5	15	23.7
Park View	7 "	24	5N	78W	9200	5/1	28.4	8.9	9.1	7.0	15	7.0
Columbine Lodge	8 "	21	5N	82W	9300	4/26	69.8	28.8	20.8	21.4	15	19.3
Willow Cr.Pass*	62 "	1	4N	78W	9500	5/1	45.2	14.8	15.8	14.1	13	12.9
Northgate	136 "	8	1N	79W	8500	5/1	17.4	4.2	1.3	--	--	
Bottle Creek	7 Wyo.	24	14N	85W	8200	4/26	31.4	12.8	14.9	6.8	15	12.8
Webber Spring	8 "	27	14N	85W	9000	4/26	45.5	17.1	19.6	16.0	15	16.8
Old Battle	9 "	29	14N	85W	9800	4/26	85.5	34.9	37.7	36.9	15	33.2
N.French Creek	37 "	27	16N	80W	10200	4/28	94.0	38.3	35.1	33.2	13	32.8
N.Barrett Creek	38 "	30	16N	80W	9400	4/28	60.0	21.7	22.1	23.6	15	21.8
Ryan Park	39 "	34	16N	81W	8400	4/28	23.5	8.4	8.5	8.2	15	7.1
Spring Creek	67 "	32	15N	85W	9000	4/26	35.4	14.9	21.1	13.5	2	--
Albany	68 "	18	14N	78W	9400	4/29	44.1	17.0	12.4	10.4	2	--
La Bonte	69 "	11	27N	74W	8450	4/29	0.0	0.0	0.0	0.0	2	--
Boxelder	70 "	31	30N	75W	9000	4/28	20.1	4.9	5.4	--	1	--
Pearl	71 "	18	12N	82W	8900	5/1	5.7	1.2	--	--	0	--
			Average for Drainage				55.2	20.9	20.8	19.2		18.7
CROW CREEK												
Pole Mtn. #2*	34 Wyo.	35	15N	72W	8700	5/1	7.5	1.1	1.1	2.9	14	2.4

*On adjacent drainage

PLATTE-ARKANSAS RIVERS SNOW SURVEYS

May 1, 1951

Drainage Basin and Snow Course	Location: No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Cover Measurement: Snow Depth (Inches)	Water Content (Inches) 1951	1950	1949	Yrs. of Rec.	Av. Water Content (Inches)
PLATTE RIVER												
LARAMIE RIVER												
W.Port.G-P.Tun.	4 Colo.	7	8N	75W	8600	4/26	29.5	9.4	3.6	3.0	14	4.0
Deadman Hill*	50 "	26	10N	75W	10200	4/29	68.5	22.7	17.4	18.9	12	16.8
Roach	88 "	5	10N	77W	9800	4/28	68.1	24.6	23.2	22.0	10	20.2
McIntyre	111 "	35	10N	76W	9100	4/30	43.1	12.8	11.4	10.5	2	—
Brooklyn Lake	3 Wyo.	11	16N	79W	10200	4/29	96.3	36.9	27.8	27.4	15	24.5
Fox Park	11 "	21	13N	78W	9300	4/29	29.4	10.0	4.7	5.1	15	5.4
Pole Mtn.#2*	34 "	35	15N	72W	8700	5/1	7.5	1.1	1.1	2.9	14	2.4
Libby Lodge	35 "	29	16N	78W	8700	4/30	45.7	15.8	9.2	6.9	15	5.0
Hairpin Turn	36 "	24	16N	79W	9500	4/29	56.6	19.0	15.5	12.8	15	10.8
Albany	68 "	18	14N	78W	9400	4/29	44.1	17.0	12.4	10.4	2	—
	Average for drainage						50.2	17.4	12.8	12.4		11.1
POUDRE RIVER												
Cameron Pass	1 Colo.	2	6N	76W	10300	4/30	68.8	23.5	24.2	24.5	15	23.7
Chambers Lake	2 "	6	7N	75W	9000	4/29	27.6	10.0	3.9	2.5	15	3.8
Big South	3 "	33	8N	75W	8600	4/29	5.1	1.5	1.1	0.1	15	0.6
Deadman Hill	50 "	26	10N	75W	10200	4/29	68.5	22.7	17.4	18.9	12	16.8
Lake Irene*	65 "	8	5N	75W	10600	4/28	84.4	34.5	21.0	26.1	13	23.4
Hour Glass Lake	68 "	18	7N	73W	9500	4/28	40.9	14.6	7.0	11.5	11	7.3
Red Feather	128 "	26	10N	74W	9000	4/28	27.9	8.4	3.2	0.0	2	--
Lost Lake	156 "	32	8N	75W	9300	4/29	42.1	13.0	—	—	--	—
	Average for drainage						49.2	17.8	12.4	13.9		12.6
BIG THOMPSON RIVER												
Lake Irene*	65 "	8	5N	75W	10600	4/28	84.4	34.5	21.0	26.1	13	23.4
Hidden Valley	95 "	23	5N	75W	9550	5/1	55.5	18.3	12.5	15.6	10	12.9
Deer Ridge	115 "	19	5N	73W	9050	5/1	23.2	7.4	1.5	2.3		--
Longs Peak	148 "	32	4N	73W	10500	5/1	53.3	19.0	--	--		—
	Average for drainage						70.0	26.4	16.8	20.9		18.2
ST. VRAIN RIVER												
Wild Basin	41 Colo.	24	3N	74W	10000	5/1	59.3	22.4	14.5	16.2	15	13.5
Copeland Lake	116 "	21	3N	73W	8600	5/1	13.6	4.9	0.7	0.6	2	--
Ward	134 "	1	1N	73W	9500	5/1	33.7	10.5	3.9	0.0	1	—
	Average for drainage						59.3	22.4	14.5	16.2		13.5

*On adjacent drainage

PLATTE-ARKANSAS RIVERS SNO. SURVEYS
May 1, 1951

Drainage Basin and Snow Course	Location: No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Snow Cover Measurements: Water Content (Inches) 1951	1950	1949	Yrs. of Record	Past Record: Av. Water Content (Inches)
PLATTE RIVER												
BOULDER CREEK												
E.Port.Moffat T.	5 Colo.	2	2S	74W	9400	5/1	11.6	3.8	3.1	1.0	15	1.7
University Camp	60 "	28	1N	73W	10300	4/30	88.7	36.6	18.7	—	12	21.5
Moffat	133 "	2	3S	74W	9400	5/1	36.8	14.0	6.1	--	1	--
	Average for drainage						50.2	20.2	10.9	--		11.6
CLEAR CREEK												
Loveland Pass	61 "	27	4S	76W	10600	4/27	61.9	22.4	15.5	9.6	15	13.0
Grizzly Peak*	97 "	2	5S	76W	11250	4/27	81.1	27.7	23.0	15.8	9	18.7
Empire	117 "	21	3S	75W	9650	4/29	34.3	10.5	6.0	3.6	2	--
Berthoud Falls	137 "	16	3S	75W	10500	4/29	51.6	18.0	--	--	--	--
Berthoud Summit	138 "	10	3N	75W	11300	4/29	68.6	19.7	--	--	--	--
Clear Creek	160 "	27	4S	76W	11200	4/27	75.2	25.6	--	--	--	--
	Average for drainage						71.5	25.1	19.3	12.7		15.9
SOUTH PLATTE RIVER												
Hoosier Pass	14 Colo.	13	8S	78W	11400	4/30	53.2	16.7	10.4	9.1	15	10.9
Fairplay	15 "	33	9S	77W	10000	4/30	0.0	0.0	0.0	0.0	15	0.1
Jefferson Cr.	83 "	14	7S	76W	10100	4/30	38.2	11.8	6.0	5.7	14	5.3
Geneva Park	118 "	18	6S	74W	9750	5/1	13.1	3.7	1.0	0.0	2	
Antero	120 "	1	13S	77W	9200	4/27	0.0	0.0	0.0	0.0	2	
Deer Creek	130 "	28	6S	78W	8950	5/1	0.0	0.0	0.0	0.0	2	
	Average for drainage						30.5	9.5	5.5	4.9		5.4
ARKANSAS RIVER												
Tennessee Pass	19 Colo.	21	8S	80W	10200	5/1	32.6	11.8	8.0	3.4	15	5.4
Twin Lakes T.	21 "	22	11S	82W	10500	4/28	40.7	11.1	6.5	7.3	14	8.7
Marshall Creek*	42 "	24	48N	6E	10800	4/28	43.5	13.5	4.6	12.4	15	10.2
Poncha Creek	43 "	19	48N	7E	10500	4/28	42.6	14.4	3.7	9.2	15	8.3
Whiskey Creek	72 "		37.2N	105.2W	10300	4/30	2.0	0.6	0.0	2.0	13	4.4
La Veta Pass*	74 "	22	28S	70W	9300	4/30	3.8	1.0	0.0	2.0	15	3.8
4-Mile Park	78 "	23	11S	81W	9700	5/1	3.8	1.2	0.0	0.0	13	0.3
Fremont Pass	79 "	2	8S	79W	11400	4/27	76.3	27.7	19.2	14.9	15	17.1
Blue Lakes	81 "	30	31S	69W	10000	5/2	17.6	6.1	1.0	7.2	13	6.9
Monarch Pass	92 "	16	49N	6E	10500	4/26	60.3	21.7	11.3	17.5	10	18.1
St. Elmo	119 "	31	15S	80 W	10600	4/27	41.7	13.2	16.5	11.3	2	
Timberline	121 "	8	9S	81W	11100	4/30	63.8	21.3	21.4	21.2*	2	
*On adjacent drainage	Average for drainage						32.3	10.9	5.4	7.6		8.3

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SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

Rio Grande Drainage Basin

LIBRARY
CURRENT SERIAL RECORD
JUN 1 1951
U.S. DEPARTMENT OF AGRICULTURE

By

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.

As of

MAY 1, 1951

FEDERAL-STATE COOPERATIVE SNOW SURVEY AND IRRIGATION WATER SUPPLY FORECASTS

FOR

RIO GRANDE BASIN

Report Prepared

by

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Soil Conservation Service
Colorado Experiment Station
Fort Collins, Colorado

Miscellaneous Series Paper No. 491
Colorado Agricultural Experiment Station

WATER SUPPLY OUTLOOK
RIO GRANDE AND CANADIAN DRAINAGE BASINS
May 1, 1951

The water supply outlook for the Rio Grande in San Luis Valley is not favorable at this time and is critically unfavorable in New Mexico. Snow cover along the Continental Divide is about 70 percent of normal. On the Sangre de Cristo range to the east of San Luis Valley the current snow cover is 50 percent of average. In northern New Mexico the snow fall has been extremely deficient with near minimum snow measurements on most courses during the winter months. Precipitation has been deficient and soil moisture conditions are poor throughout the valley.

RIO GRANDE

Seasonal snow accumulation to May 1 along the Continental Divide to the west of San Luis Valley is about 70 percent of normal. To the east of the valley along the Sangre de Cristo and Culebra ranges snow cover is about 50 percent of normal. There is no snow on the valley floor or in the foothills. The summer flow of the Rio Grande, Alamosa and Conejos Rivers will be about 50 percent of normal. The soil moisture conditions in irrigated areas are only fair due to deficient precipitation during the past several months. Storage in irrigation reservoirs is about 15 percent of May 1, 1950 and much below the past average.

On the Rio Chama the summer flow will be about 50 percent of normal and similar to a year ago. Elsewhere in northern New Mexico the snowfall has been very deficient. Precipitation in northern New Mexico has been above normal at higher elevations during April. On the Rio Grande-Canadian Divide the snowfall has been slightly more than last year but much below the past average. Soil moisture conditions are described as poor in the middle Rio Grande area. Storage in El Vado reservoir is now 30,000 acre-feet as compared to 66,000 acre-feet a year ago.

The combined storage in Elephant Butte and Caballo reservoirs is now 340,000 acre-feet, less than one-half of that stored on May 1, 1950. Soil moisture in the lower Rio Grande valley is reported as fair. Streamflow is well below normal.

There has been practically no snow on the headwaters of the Pecos near Santa Fe. Storage in the Carlsbad project reservoirs is over 100,000 acre-feet, slightly less than last year but well above the past ten year average.

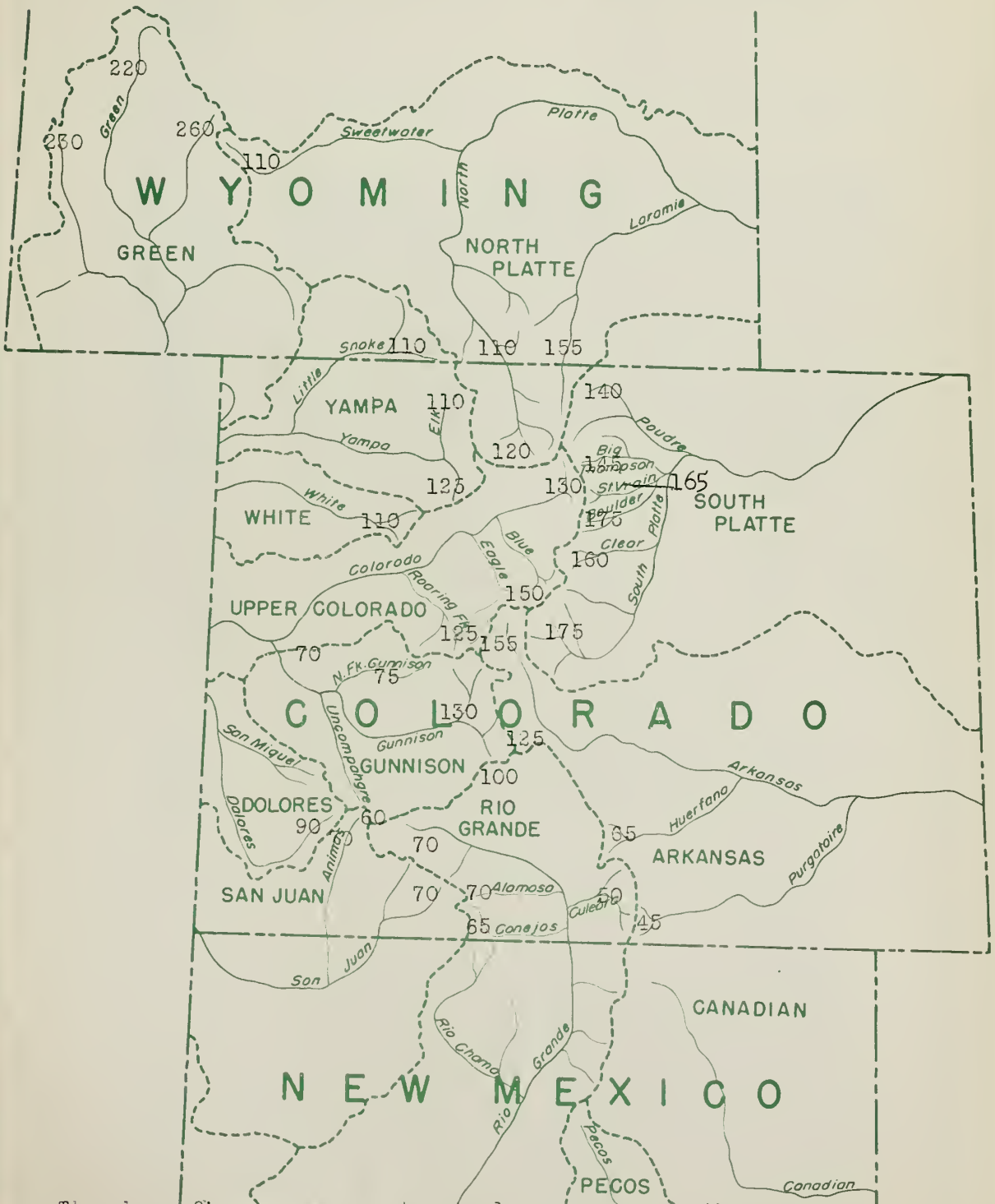
The general water supply outlook for the Rio Grande drainage is critically unfavorable. A series of dry years has depleted reservoir storage and very little summer runoff may be expected from the past season snow accumulation. An extreme curtailment of water use, especially in New Mexico, will be necessary.

CANADIAN DRAINAGE

There has been very little snow on Canadian River tributaries. April precipitation has been below normal. Soil moisture conditions are reported as fair in the Tucumcari project. Storage in Conchas reservoir is now 268,000 acre-feet as compared to 289,000 acre-feet a year ago.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal
May 1, 1951



Note: The above figures represent actual snow cover on the snow courses on the watershed in percent of normal May 1, 1951. These do not necessarily coincide with expected summer runoff in percent of normal.

RIO GRANDE DRAINAGE BASINS

STREAM FLOW FORECASTS, May 1, 1951

BASIN AND STREAM	April-Sept., Incl., Streamflow, Acre Feet				
	Forecast 1951	Measured Runoff 1950	1949	1948	10-YEAR Avg., 1940-1949
Sou RIO GRANDE					
South Fork at South Fork	90,000		197,000	192,000	142,000
Rio Grande at Del Norte	325,000	397,000	832,000	823,000	604,000
Alamosa above Terrace Res.	45,000		105,000	100,000	81,000
Conejos at Mogote	150,000	148,000	268,000	262,000	224,000
Culebra at San Luis	15,000		35,000	36,000	37,000
Rio Chama at Park View	120,000		320,000	222,000	232,000
Costilla at Costilla	15,000	15,000	33,000	35,000	39,000
Toas at Los Cordovas	15,000		28,000	29,000	45,000
Embudo Creek at Dixon	25,000		53,000	65,000	65,000
Rio Grande at Otowi Bridge	225,000*	267,000	962,000	987,000	915,000
Rio Grande at San Marcial	75,000		852,000	727,000	717,000
Pecos at Pecos	20,000	13,000	79,000	70,000	73,000

*Including change in syorage in El Vado Res.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, MAY 1, 1951

STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	THOUSANDS OF ACRE FEET IN STORAGE About May 1				10-year ave.*
			1951	1950	1949	1948	1941-50
RIO GRANDE							
	Rio Grande	45.8	5.1	19.7	21.2	30.5	18.1
	Santa Maria	45.0	2.9	22.5	17.3	7.5	13.0
	Sanchez	103.0	4.4	13.0	8.9	12.0	16.1
	Terrace	17.7	1.8	4.4	2.7	10.7	4.6
	Continental	26.7	5.0	19.0	12.6	8.9	10.9
	Elephant Butte	2273.7	196.8	615.2	508.3	408.6	960.9
	Caballo	365.0	144.1	193.7	149.4	151.9	185.6
CHAMA RIVER							
	El Vado	226.0	30.0	66.0	115.0	98.0	113.9
CANADIAN RIVER							
	Conchas	600.0	268.3	288.8	300.6	371.0	324.5
PECOS RIVER							
	Alamogordo	148.0		73.5	11.4	1.5	41.6
	McMillan-Avalon	45.0		3.5	3.9	5.5	13.3

*Some for shorter periods

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
May 1, 1951

SUMMARY OF MAY 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth			Water Content			Number Courses in Average	Snow Density			1951 Water Content in percent of	
	Fifteen year Avg.*	1950	1951	Fifteen year Avg.*	1950	1951		Fifteen year Avg.*	1950	1951	Fifteen Yr. Avg.*	1950
	In.	In.	In.	In.	In.	In.		Percent	Percent	Percent		
Rio Grande (Colo.)	21.7	10.0	17.6	8.7	4.5	5.3	10	40	45	30	61	118
Upper Rio Grande	23.1	11.5	23.0	10.2	5.6	7.0	3	44	49	30	69	125
Alamosa River	34.0	27.5	28.0	12.0	10.9	8.1	2	35	41	29	67	75
Conejos River	18.3	5.5	17.7	6.6	2.8	5.3	5	36	51	30	80	190
Culebra River	25.6	0.0	17.1	9.1	0.0	4.5	1	36	—	26	50	—

*Some for shorter periods

PRECIPITATION DATA*

WATERSHED	STATE	Precipitation October 1 to April 30	Departure from Normal	Precipitation April	Departure from Normal
		Inches	Inches	Inches	Inches
Canadian	New Mexico	2.79	-2.56	1.02	-0.16
Rio Grande	Colorado	5.85	-4.62	1.50	+0.04
Rio Grande (N)	New Mexico	3.74	-2.98	1.22	+0.01
Rio Grande (S)	New Mexico	1.59	-1.98	0.48	-0.04
Pecos	New Mexico	2.75	-2.56	0.57	-0.40

*Average of Selected High Elevation Stations.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
May 1, 1951

SUMMARY OF MAY 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth: Fifteen year Avg.*	Snow Depth: 1950	Snow Depth: 1951	Water Content: Fifteen year Avg.*	Water Content: 1950	Water Content: 1951	Number Courses in Average	Snow Density: Fifteen year Avg.*	Snow Density: 1950	Snow Density: 1951	1951 Water Content in percent of: Fifteen Yr. Avg.*	1951 Water Content in percent of: 1950
	In.	In.	In.	In.	In.	In.		Percent	Percent	Percent		
Rio Grande (Colo.)	21.7	10.0	17.6	8.7	4.5	5.3	10	40	45	30	61	118
Upper Rio Grande	23.1	11.5	22.0	10.2	5.6	7.0	3	44	25	30	69	125
Alamosa River	31.0	27.5	28.0	12.0	10.9	8.1	2	35	41	29	67	75
Conejos River	18.3	5.5	17.7	6.6	2.8	5.3	5	36	31	30	80	190
Culebra River	25.6	0.0	17.1	9.1	0.0	4.5	1	36	--	26	50	--

*Data for shorter periods.

PRECIPITATION DATA*

WATERSHED	STATE	Precipitation October 1 to April 30	Departure from Normal	Precipitation April	Departure from Normal
		Inches	Inches	Inches	Inches
Canadian	New Mexico	2.79	-2.56	1.02	-0.15
Rio Grande	Colorado	5.05	-4.52	1.50	+0.04
Rio Grande (N)	New Mexico	3.74	-2.95	1.22	-0.01
Rio Grande (S)	New Mexico	4.59	-1.98	0.48	-0.06
Pecos	New Mexico	2.75	-2.56	0.51	-0.[illegible]

*Average of Selected High Elevation Stations.

RIO GRANDE DRAINAGE SNOW SURVEYS
May 1, 1951

Drainage Basin and Snow Course	Location: No. and State	Sec.	Twp.	Range	Elev.	Snow Cover Measurements: Date of Survey	Snow Depth (Inches)	Water Content (Inches) 1951	1950	1949	Past Record: Yrs. of Rec.	Av. Water Content (Inches)
RIO GRANDE IN COLORADO												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	4/30	69.0	20.9	16.8	39.5	15	27.0
Upper Rio Grande	27 "	13	40N	4W	9350	5/1	0.0	0.0	0.0	6.8	15	2.3
Silver Lakes	47 "	15	36N	5E	9600	4/27	0.0	0.0	0.0	0.8	14	1.0
River Springs	49 "	25	33N	6E	9300	5/1	0.0	0.0	0.0	0.3	14	1.0
La Veta Pass #2	74 "	22	28S	70W	9300	4/30	3.8	1.0	0.0	2.0	15	3.8
Summitville	76 "	30	37N	4E	11500	4/30	56.0	16.2	21.8	30.0	11	23.1
Cumbres Pass #2	77 "	17	32N	5E	10000	5/2	30.5	10.5	6.0	18.7	15	18.2
Santa Maria	80 "	8	41N	2W	9700	5/1	0.0	0.0	0.0	0.0	12	1.2
Culebra	82 "		37.2N	105.2W	10000	4/30	17.1	4.5	0.0	8.2	11	9.1
Ft. Garland	84 "	13	29N	72W	8200	4/29	0.0	0.0	0.0	0.0	11	0.7
Platoro	108 "	22	36N	4W	9950	4/30	28.7	8.6	5.0	18.5	2	
West Conejos	109 "	25	35N	4E	9450	5/1	0.0	0.0	0.0	0.3	2	
La Manga	110 "	24	32N	5E	10100	5/2	29.3	7.7	2.0	20.2	2	
Pyramid	122 "	26	41N	5W	10300	4/28	6.2	1.9	0.3	9.1	2	
Spr. Creek Pass	123 "	2	42N	3W	10900	4/27	12.3	3.9	0.0	10.8	2	
Pool Table Mt.	124 "	19	41N	2E	10000	4/30	6.7	1.4	0.0	5.5	2	
Lake Humphreys	125 "	32	40N	1E	9300	4/30	0.0	0.0	0.0	0.9	2	
Cochetopa Pass	126 "	12	45N	3E	10000	4/30	10.5	3.1	0.0	4.1	2	
Howardville	151 "	15	41N	7E	9800	4/29	11.9	4.9	--	--	-	
Red Mt. Pass	153 "	13	42N	8E	11000	4/28	71.4	28.8	--	--	-	
Porcupine	154 "	2	41N	3W	10400	4/30	9.1	3.8	--	--	-	
Wolf Creek Summit	155 "	6	37N	2E	11000	4/30	73.9	22.1	--	--	-	
	Average for drainage						17.6	5.3	4.5	10.6		8.7
UPPER RIO GRANDE												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	4/30	69.0	20.9	16.8	39.5	15	27.0
Upper Rio Grande	27 "	13	40N	4W	9350	5/1	0.0	0.0	0.0	6.8	15	2.3
Santa Maria	80 "	8	41N	2W	9700	5/1	0.0	0.0	0.0	0.0	12	1.2
Pyramid	122 "	26	41N	5W	10300	4/28	6.2	1.9	0.3	9.1	2	
Sp. Creek Pass	123 "	2	42N	3W	10900	4/27	12.3	3.9	0.0	10.8	2	
Pool Table Mt.	124 ""	19	41N	2E	10000	4/30	6.7	1.4	0.0	5.5	2	
Lake Humphreys	125 "	32	40N	1E	9300	4/30	0.0	0.0	0.0	0.9	2	
	Average for drainage						23.0	7.0	5.6	15.4		10.2

RIO GRANDE DRAINAGE SNOW SURVEYS
May 1, 1951

Drainage Basin and Snow Course	Location					Snow Cover Measurements						
	No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches) 1951	1950	1949	Past Record Yrs. of Rec.	Av. Water Content (Inches)
ALAMOSA RIVER												
Silver Lakes	47 Colo.	15	36N	5E	9600	4/27	0.0	0.0	0.0	0.8	14	1.0
Summitville	76 "	30	37N	4E	11600	4/30	56.0	16.2	21.8	30.0	11	23.1
	Average for drainage						28.0	8.1	10.9	15.4		12.0
CONEJOS RIVER												
River Springs	49 Colo.	25	33N	5E	9300	5/1	0.0	0.0	0.0	0.3	14	1.0
Cumbres Pass #2	77 "-	17	32N	5E	10000	5/2	30.5	10.5	6.0	18.7	15	18.2
Platoro	108 "	22	36N	4W	9950	4/30	28.7	8.6	5.0	18.5	2	11.8
West Conejos	109 "	25	35N	4E	9450	5/1	0.0	0.0	0.0	0.3	2	0.2
La Manga	110 "	24	32N	5E	10100	5/2	29.3	7.7	2.9	20.2	2	1.5
	Average for drainage						17.7	5.3	2.8	11.6		6.6
CULEBRA RIV R												
Culebra	82 Colo.		37.2N	105.2W	10000	4/27	17.1	4.5	0.0	8.2	11	9.1

Federal - State - Private

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